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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,016	06/30/2003	Kazutaka Shibata	AI 288	1927
7590 10/28/2004			EXAMINER	
RABIN & BERDO, P.C.			VU, QUANG D	
Suite 500			ART UNIT	
1101 14 Street, N.W.			2811	
Washington, DC 20005			PAPER NUMBER	

DATE MAILED: 10/28/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

KD

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/608,016	SHIBATA, KAZUTAKA	
	<b>Examiner</b>	<b>Art Unit</b>	
	Quang D Vu	2811	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 30 June 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-6 and 8-10 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6 and 8-10 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 06/30/03.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Election/Restrictions*

Applicant's election without traverse of group I, claims 1-6 and 8-10, in the reply filed on 06/30/04 is acknowledged.

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claim 1 is rejected under 35 U.S.C. 102(e) as being anticipated by US Patent No. 6,376,916 to Hosono et al.

Regarding claim 1, Hosono et al. (figures 10-12) teach a semiconductor device, comprising:

a semiconductor substrate (column 6, lines 41-46);

at least one of a protruding electrode (8) and wiring (lead [4]) formed on one surface of the semiconductor substrate; and

a first resin film (resin [6A, 6B]) formed on the one surface of the semiconductor substrate,

Art Unit: 2811

wherein the first resin film has elasticity low enough to reduce stress induced by a difference in thermal expansion coefficient between the semiconductor substrate and the first resin film (column 5, lines 45-49).

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claim 8 is rejected under 35 U.S.C. 102(b) as being anticipated by US Patent No. 5,525,838 to Kanedo.

Regarding claim 8, Kanedo (figures 4-5) teaches semiconductor device, comprising:  
semiconductor chip (11);  
an electrode pad (14) formed on the semiconductor chip (11);  
a resin film (20) formed to cover a surface of the semiconductor chip (11); and  
a post (15) bonded to the electrode pad (14) and provided to penetrate through the resin film (20), a portion of which in close proximity to a junction portion with the electrode pad (14) is made of gold ([15] is made of gold; column 3, lines 4-5).

### ***Claim Rejections - 35 USC § 103***

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person

Art Unit: 2811

having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claim 2 are rejected under 35 U.S.C. 103(a) as being unpatentable -over US Patent No. 6,376,916 to Hosono et al. in view of US Patent No. 6,404,049 to Shibamoto et al.

Regarding claim 2, Hosono et al. differ from the claimed invention by not showing an elastic modulus of the first resin film is 15 GPa or lower. However, Shibamoto et al. teach an elastic modulus of resin layer is 5 – 30 GPa (column 8, lines 4-9). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Shibamoto et al. into the device taught by Hosono et al. because it protects the device from the external contamination.

7. Claims 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,376,916 to Hosono et al. in view of US Patent No. 5,925,936 to Yamaji and US Patent Application Publication No. 2002/0072151 to Amami et al.

Regarding claim 3, Hosono et al. differ from the claimed invention by not showing a second resin film formed on the other surface of the semiconductor substrate. However, Yamaji (figure 5) shows a second resin film (resin [11]) formed on the other surface of the semiconductor substrate. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Yamaji into the device taught by Hosono et al. because it protects the bottom surface of the substrate.

The combined device shows a first resin (Yamaji; thermoplastic resin [3]; column 4, lines 28-29) and second resin (Yamaji; thermosetting resin [11]; column 5, lines 29-30). The combined device differs from the claimed invention by not showing a second resin film having

Art Unit: 2811

higher strength than the first resin film is formed on the other surface of the semiconductor substrate. However, Amami et al. shows the thermoplastic resin has a low bonding strength (paragraph [0015]) and the thermosetting resin has high bonding strength (paragraph [0016]). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Amami et al. into the device taught by Hosono et al. and Yamaji because the electrical property of device is improved.

Regarding claim 6, the combined device shows the semiconductor substrate is placed at a center of the semiconductor device in a thickness of a cross section thereof. The combined device differs from the claimed invention by not showing the semiconductor substrate has a thickness of 200  $\mu\text{m}$  or less. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the semiconductor substrate has a thickness of 200  $\mu\text{m}$  or less because it reduces the thickness of the device. Furthermore, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

8. Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Hosono et al. and Yamaji in view of Amami et al., and further in view of US Patent No. 6,404,049 to Shibamoto et al.

Regarding claim 4, the disclosures of Hosono et al., Yamaji and Amami et al. are discussed as applied to claims 3 and 6 above.

The combined device differs from the claimed invention by not showing an elastic modulus of the first resin film is 15 GPa or higher. However, Shibamoto et al. teach an elastic

Art Unit: 2811

modulus of resin layer is 5 – 30 GPa (column 8, lines 4-9). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Shibamoto et al. into the device taught by Hosono et al., Yamaji and Amami et al. because it protects the device from the external contamination.

9. Claim 5 is rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 6,376,916 to Hosono et al.

Regarding claim 5, Hosono et al. differ from the claimed invention by not showing the semiconductor substrate has a thickness of 550  $\mu\text{m}$  or less. It would have been obvious to one having ordinary skill in the art at the time the invention was made for the semiconductor substrate has a thickness of 550  $\mu\text{m}$  or less because it reduces the thickness of the device. Furthermore, it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art. In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980).

10. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over US Patent No. 5,525,838 to Kanedo and US Patent No. 6,281,046 to Lam.

Regarding claim 9, Kanedo differs from the claimed invention by not showing the post includes a portion made of a metal material other than gold. However, Lam (figures 1-8) shows the post includes a portion (a portion of layer [18]) made of metal material other than gold ([18] is made of Ni; column 3, line 44). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Lam into the



Art Unit: 2811

device taught by Kanedo because it provides connection between the electrode pad and other device.

Regarding claim 10, Kanedo teaches the post includes a junction portion (15) provided on a side of the electrode pad (14) and made of gold ([15] is made of gold; column 3, lines 4-5). Kanedo differs from the claimed invention by not showing an intermediate portion provided on the junction portion and made of a metal material other than gold, and a tip end portion provided on the intermediate portion and made of gold. However, Lam (figures 1-8) shows an intermediate portion (a portion of layer [18]) provided on the junction portion (17) and made of a metal material other than gold ([18] is made of Ni), and a tip end portion (a top portion layer [19]) provided on the intermediate portion (18) and made of gold ([19] is made of gold; column 3, lines 42-43). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to incorporate the teaching of Lam into the device taught by Kanedo because it provides connection between the electrode pad and the external device.

### *Conclusion*

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Quang D Vu whose telephone number is 571-272-1667. The examiner can normally be reached on Monday-Friday.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Eddie Lee can be reached on 571-272-1732. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



Art Unit: 2811

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

qv  
October 21, 2004



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